UCRL-JC-124867 Abs

RELATIVISTIC LASER PULSE SELF-FOCUSING*

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The relativistic self-focusing behavior of laser radiation with power much larger than the critical power ($1.6\ 10^{10}\ (n_C/n)^{1/2}$ Watts in underdense plasmas) was investigated. Tight stable channels which could confine an arbitrarily large power were found to form. The characteristic diameter of these channels was on the order of a few wavelengthes.

The dynamics of radiation filled channels including the effects of "electron cavitation" was investigated. Effects of plasma inhomogeneity, laser beam profile and prefocusing were evaluated. The stability of axially symmetric relativistic self-channeling was confirmed by 3D numerical simulations.

* Work at LLNL performed under the auspices of the U.S. Department of Energy under contract No. W-7405-ENG-48.

for
38th Annual Meeting of APS Division of Plasma Physics
Denver,CO, Nov. 11-15, 1996